**Teacher’s Guide**

1. The purpose of this lab is to explore basic human anatomy/physiology. The students have a chance to actually see how blood pressure works as it relates to what happens when they see a doctor. Basic lab skills are also reinforced in this lab. Science literacy is also covered in this lab as students are expected to graph and interpret data.

2. **Concepts/objectives/standards**

**Concepts:**

-Basic human anatomy/physiology of the heart and lungs.

**Objectives: TSWBAT:**

-Describe what systolic blood pressure, diastolic blood pressure, and what the difference between the two is.

-Explain inspiratory reserve volume, tidal volume, expiratory reserve volume, vital capacity, residual volume, and total lung capacity.

-Collect values of their own blood pressures (before and after exercise) and lung capacities.

-Create a graph comparing their own blood pressures before and after physical activity and to known normal blood pressure values.

**Illinois Learning Standards**:

Stage H 13 A 1:

Apply appropriate principles of safety within and beyond the science classroom, communicating and following clear instructions, mapping classrooms for safe egress and distances/times to access safety treatment features, demonstrating safety practices and emergency procedures pertaining to laboratory and field work, or explaining the basis of safety practices and procedures.

Stage H 13 A 2:

Apply scientific habits of mind to curricular investigations in life, environmental, physical, earth, and space sciences, evaluating evidence, inferring statements based on data, questioning sources of information, explaining necessity of manipulating only one variable at a time, or retrieving mathematical data accurately for scientific analysis.

Stage H 11 B 3:

Collect and record data accurately, using consistent metric measuring and recording techniques with necessary precision, recording data accurately in appropriate format, or graphing data appropriately according to the tested variables.

3. **Materials/preparation guide (including what should be at**

**each lab station)**

-1 stethoscope

-1 arm cuff

-1 stop watch

-2 copies of lab handout

-1 spirometer for the whole class

4. **Time/length of lab**

-These students should be able to get all data collected within the class period and most of them will most likely have some calculation/questions to do for homework. This is about a 45 minute lab.

5. **Safety issues**

-There is not any big safety concerns associated with this lab. Students should never inhale with their mouth over the mouthpiece of the spirometer. Students should also be careful when they are told to exercise.

6. **Prelab/postlab discussion guide**

-As a prelab the students will be told they are in astronaut try-outs. A review of how the heart and lungs work will take place at this time. I will also explain how to take a blood pressure reading as this is quite confusing even though I have detailed instructions in the procedure. As a post lab I will hold a short discussion where as a class we will go over the questions at the end of the lab handout. Students can tell me/class if they are eligible to become an astronaut. If not they can share what went wrong and they are given a chance to share other ideas.

7. **Any special notes**

-If a student figures out that he/she has very poor heart rate, blood pressure, or lung capacity readings that may scare them a little bit. I am not the one to access their health so I must point them towards their family doctor if this happens.

8. **A diagram of the lab set up:**

-Students will work in groups of 2.

-Stethoscopes, arm cuffs, and stop watches can be passed out to each lab station before school even starts of the same. The spirometer just needs to filled up with water so that can be set up before class too. All lab handouts can also be at workstations.